



Alan C. Lloyd, Ph.D.  
Agency Secretary  
Cal/EPA

N60028\_001368  
TREASURE ISLAND  
SSIC NO. 5090.3.A

## Department of Toxic Substances Control

---



Arnold Schwarzenegger  
Governor

Maureen Gorsen  
700 Heinz Avenue, Suite 200  
Berkeley, California 94710-2721

### MEMORANDUM

**TO:** David Rist, Office of Military Facilities (OMF)  
OMF Berkeley Office  
740 Heinz, Suite 200  
Berkeley, CA 94704

**FROM:** James M. Polisini, Ph.D  
Staff Toxicologist  
Human and Ecological Risk Division (HERD)  
1101 North Grandview Avenue  
Glendale, California 91201

**DATE:** March 15, 2006

**SUBJECT:** ECOLOGICAL SCREENING SOIL AND AQUATIC VALUES  
FOR NAVAL STATION TREASURE ISLAND  
[SITE 201210-18 PCA 18040 H:28]

---

### BACKGROUND

HERD recently entered into discussions with the Navy to formalize the informal discussions and conclusions, among representatives of HERD, the U.S. EPA Region 9 and the U.S. Navy, regarding the necessity for a terrestrial Ecological Risk Assessment (ERA) for the Treasure Island (TI) portion of Naval Station Treasure Island (NAVSTATI). HERD participated in a meeting at NAVSTATI, on September 21, 2005, to clarify the original discussion, referenced as having occurred on June 3, 1994. Dr. James Polisini was the member of HERD who participated in the June 3, 1994 site visit along with Dr. Clarence Callahan of the U.S. EPA Region 9. Prior to the September 21, 2005 meeting HERD contacted Dr. Clarence Callahan, currently of the State of Hawaii Department of Health. The intent of the comments made by HERD and U.S. EPA Region 9 after the 1994 site visit to NAVSTATI, as recently confirmed with Dr. Callahan, was that an extensive ERA need not be prepared for the more mobile terrestrial receptors (i.e., more mobile mammals and birds) which would preferentially utilize habitats at Yerba Buena Island rather than the 'developed' areas of Treasure Island. However, a screen for potential

adverse effects of soil contaminants on the soil invertebrate community and terrestrial plants should still be performed along with a presentation of the detected soil concentrations. At the September 21, 2005 NAVSTATI meeting HERD agreed to participate in development of a methodology to prepare a simplified terrestrial screening for plants, soil invertebrates, and relatively non-mobile potential future bird and mammal receptors (i.e., an insectivorous bird and a shrew). This simplified ecological screening is scoped as the development of soil screening concentrations expected to be protective of these four guilds of ecological receptors.

HERD reviewed the following electronic submittals in preparation for a March 10, 2006 conference call:

1. *DTSC Screening Criteria (12-16-05).xls* – A tabular listing of California Toxic Rules for Enclosed Bays and Estuaries, National Recommended Water Quality Criteria (EPA, 2002), National Ambient Water Quality Criteria (NAWQC) as listed by the California Regional Water Board (California Water Board, 2000), the proposed TI aquatic screening criteria and the NAVSTATI ambient groundwater concentrations.
2. *Screening Benchmarks.xls* – A tabular listing of Ecological Soil Screening Levels (EcoSSLs) for plants, Oak Ridge National Laboratory (ORNL) soil screening concentrations for plants, EcoSSLs for soil invertebrates, ORNL invertebrate soil screening concentrations, EcoSSLs for birds, Toxicity Reference Value-Lows (TRV<sub>low</sub>) for birds, EcoSSLs for mammals, TRV<sub>low</sub> for mammals and inhalation TRV<sub>low</sub> for mammals.
3. *TI Exposure Parameters.xls* – A three table listing of proposed exposure parameters for the American robin, the Ornate shrew and the deer mouse.
4. *Draft Eco Mtg Minutes.doc* – A draft version of the minutes of the September 21, 2005 meeting at NAVSTATI.

Naval Station Treasure Island (NAVSTA TI) is situated midway between San Francisco and Oakland, California and consists of two contiguous islands. Yerba Buena Island (YBI) is a natural island. Treasure Island (TI) is an island constructed of dredged fill on top of a sand shoal extending from the northwest point of YBI. Treasure Island is approximately 403 acres. Clipper Cove is located between YBI and TI.

### **GENERAL COMMENTS**

During the March 10, 2006 conference call HERD questioned several of the vertebrate exposure parameters, noted one Toxicity Reference Value (TRV) that appeared to be extremely high while agreeing to review the

TRVs in detail and agreed to provide a detailed review of an acceptable method for extrapolating acute toxicity values to acceptable screening values.

### **SPECIFIC COMMENTS ON EXPOSURE PARAMETERS**

1. Regression equations based on Body Weight (BW) are used to estimate several ecological exposure parameters. The BW proposed (i.e., 77 grams) for the American robin is within the range of values available in literature and is acceptable. This comment was addressed during the March 10, 2006 conference call.
2. The intake equation selected and used to estimate the food intake rate in dry matter (Nagy, 2001) is correct and the results presented for the food intake rate are arithmetically correct. The notes column should indicate this estimated food intake rate is in dry weight not wet weight. This comment was addressed during the March 10, 2006 conference call.
3. The proposed soil ingestion rate for the American robin (i.e., 2.08 percent of the dietary intake) is less than the 10 percent soil ingestion rate commonly used. The percent soil ingestion commonly used for the woodcock, an eastern U.S. insectivorous bird, is 10 percent (Sutter, 1997 and Beyer, et al., 1994). A 10 percent soil ingestion rate for the American robin NAVSTATI calculations was proposed by HERD. This comment was addressed and resolved during the March 10, 2006 conference call.
4. The Site Use Factor (SUF) is proposed to be unity for the calculation of screening level soil concentrations. However, a Foraging Range of 0.42 hectares is also listed. In the event discussions of Foraging Range enter into interpretation of the ecological screening value, Territory Ranges from 0.04 to 0.24 hectares, with a mean of 0.12 hectares, are cited for the American Robin on the California Department of Fish and Game (DFG) web page (<http://www.dfg.ca.gov/whdab/html/B389.html>). While Home Range or Territory Range does not enter into calculation of ecological screening values, HERD will utilize the DFG listed Territory Range in any detailed discussions for the American robin. This comment was addressed during the March 10, 2006 conference call.
5. The BW proposed (i.e., 1 gram) for the Ornate shrew is within the range of values available in literature and is acceptable. This comment was addressed during the March 10, 2006 conference call.

6. The intake equation selected and used to estimate the food intake rate in dry matter (Nagy, 2001) is correct and the results presented for the food intake rate are arithmetically correct. The calculated food intake rate also agrees with individual citations of food ingestion rates (1.26 g/g/day) in the CalEcoTox database ([http://www.oehha.ca.gov/scripts/cal\\_ecotox/exposurefactordescription.asp](http://www.oehha.ca.gov/scripts/cal_ecotox/exposurefactordescription.asp)). The notes column should indicate this estimated food intake rate is in dry weight not wet weight. This comment was addressed during the March 10, 2006 conference call.
7. There appears to be a typographic error in the listing of the soil ingestion rate for the ornate shrew. The soil ingestion rate for the shrew used by the U.S. EPA in calculation of the Ecological Soil Screening Levels (EcoSSLs) is 3 percent ([http://www.epa.gov/ecotox/ecossl/pdf/ecossl\\_exec\\_sum.pdf](http://www.epa.gov/ecotox/ecossl/pdf/ecossl_exec_sum.pdf)). This value is acceptable to HERD with concurrence of the U.S. EPA Region 9. The Navy contractor agreed to contact the U.S. EPA Region 9 for concurrence.
8. Given the small size of the Foraging Range for the Ornate shrew, it is unlikely to enter into any detailed review of the potential ecological hazard posed by a NAVSTATI Installation Restoration (IR) Site and an evaluation of this exposure parameter was not performed.
9. HERD questioned the rationale for using the deer mouse, *Peromyscus maniculatus*, for evaluation of the inhalation pathway rather than the California deer mouse, *Peromyscus californicus*. Given that the inhalation rate is calculated using a regression equation based on body weight, the species is not critical. In fact, HERD agreed it is better to use the species which was used to develop the inhalation rate regression equation rather than extrapolate to a California species. The inhalation rate listed of 0.023 m<sup>3</sup>/day EPA, 1993, page 2-296) is that calculated from the BW of Millar (1989), which is 22 grams for an adult male and 20 grams for an adult female. The average of these values does not agree with the 19.3 grams listed. HERD required that the BW be the BW which yields the listed inhalation rate of 0.023 m<sup>3</sup>/day, or the inhalation rate be recalculated based on the proposed BW of 19.3 grams.

#### **SPECIFIC COMMENTS ON TOXICITY REFERENCE VALUES**

10. HERD reviewed the submitted Toxicity Reference Values (TRVs). Recent revisions and additions to the EcoSSLs (Attachment A) are indicated by the values in square brackets (i.e., [ ]). The TRVs developed by the U.S. EPA Region 9 Biological Technical Assistance Group (BTAG) should be given preference over the EcoSSL TRVs for the development of these screening level NAVSTATI values. The

EcoSSL values, both TRVs and soil concentrations, which should be included for NAVSTATI are indicated by shaded cells. All contaminant-relevant EcoSSL TRVs and soil concentrations are included for completeness but only those more protective values in the shaded cells should be used to assess NAVSTATI, potential future use.

11. Two typographic errors were noted in the contaminant names included in the spreadsheet supplied to HERD. Butyltins are listed as 'Butylins' and di-n-butylphthalate is listed as 'dibutyl phthalate'. These typographic errors should be corrected.
12. Two additional avian TRVs and five additional mammalian TRVs are presented (Attachment A) for use in the NAVSTATI screening value calculation for pyrene, low molecular weight PAHs, high molecular weight PAHs, 1,2-dichloroethane and xylene mixtures. These TRVs should be added to the final TRV table.

#### **SPECIFIC COMMENTS ON EXTRAPOLATION OF AQUATIC TOXICITY VALUES**

13. During the March 10, 2006 HERD was requested to clarify the HERD methodology for extrapolating aquatic acute adverse effect concentrations to aquatic chronic no-effect concentrations as it might differ from the 80 percent reduction attributed to the U.S. EPA. Acute exposure in aquatic toxicity tests is usually set at periods of 24 hours to 96 hours. Chronic exposure in aquatic toxicity tests is usually interpreted as exposures between 10 days and 28 days, depending on the specific aquatic toxicity test performed. An Uncertainty Factor (UF) of 10 should be applied to extrapolate from an aquatic acute exposure adverse effect concentration to a chronic aquatic exposure adverse effect concentration. An additional UF of 5 should be applied to extrapolate from an aquatic Lowest Observed Adverse Effect Level (LOAEL) to an aquatic No Observable Adverse Effect Level (NOAEL) whether the exposure is acute or chronic. For example:

$$\text{LOAEL}_{\text{acute}} / 10 = \text{LOAEL}_{\text{chronic}}$$

$$\text{LOAEL}_{\text{chronic}} / 5 = \text{NOAEL}_{\text{chronic}}$$

Please contact HERD for any necessary clarification to this methodology for aquatic effect or no-effect concentrations.

## **CONCLUSIONS**

Several exposure factors for the vertebrate representative species should be amended as described, once concurrence of U.S. EPA Region 9 is obtained.

The small number of Ecological Soil Screening Level (EcoSSL) Toxicity Reference Values, which are more protective than Biological Technical Assistance Group (BTAG) values, and have recently been amended or added, in addition to those identified from other sources, should be incorporated into this NAVSTATI effort to develop site-specific ecological screening values.

Minor typographic errors in the names of contaminants in the Toxicity Reference Value spreadsheet should be corrected.

The requested extrapolation method recommended by HERD for aquatic toxicity values is outlined and should be used in developing aquatic screening criteria where promulgated aquatic screening values are not available.

## **REFERENCES**

California Water Board. 2000. A Compilation of Water Quality Goals. Prepared by Jon B. Marshack, Central Valley Region. August.

DTSC. 1996. Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities. Part A: Overview and Part A: Overview.

EPA. 1993. Wildlife Exposure Factors Handbook. Volumes I and II. EPA/600/R-93/187a and EPA/600/R-93/187b. Office of Research and Development. Washington, D.C.

EPA, 2002. National Recommended Water Quality Criteria: 2002. EPA-822-R-02-047. November.

EPA 2002. Revision of National Recommended Water Quality Criteria. FRL-OW-7431-3. December 27.

Millar, J. S. 1989. Reproduction and development In: (G. L. Kirkland and J.N. Lane, Eds) Advances in the study of *Peromyscus* (Rodentia). Lubbock, TX: Texas Tech University Press, pp 169-205.

David Rist  
March 15, 2006  
Page 7

Tetra Tech, Inc. 2001. Final Technical Memorandum Estimation of Ambient Concentrations of Metals in Groundwater, Naval Station Treasure Island, San Francisco, California. Prepared for Naval Facilities Engineering Command, Southwest Division. March 30.

HERD Internal Reviewer: Brian K. Davis, Ph.D.  
Staff Toxicologist HERD

cc: Ned Black, Ph.D., BTAG Member  
Sonce de Vries, BTAG Member  
U.S. EPA Region IX (SFD-8-B)  
75 Hawthorne Street  
San Francisco, CA 94105

Mr. Dan Welsh  
U. S. Fish and Wildlife Service  
2800 Cottage Way  
Suite W-2605  
Sacramento, CA 95825-1846

Charlie Huang, Ph.D., BTAG Member  
California Department of Fish and Game  
1700 K Street, Room 250  
Sacramento, CA 94244-2090

Laurie Sullivan, M.S., BTAG Member  
National Oceanic and Atmospheric Administration  
c/o U. S. EPA Region 9 (H-1-2)  
75 Hawthorne Street  
San Francisco, CA 94105-3901

Alan Friedman  
San Francisco Regional Water Quality Control Board  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

Voice 818-551-2853  
Facsimile 818-551-2841  
C:\Risk\TIFuture Land Use Eco PRGs.doc\h:28

Attachment A

**Attachment A.** Proposed additions and changes to Toxicity Reference Values (TRVs) and Ecological Soil Screening Levels (Eco SSLs) for development of Naval Air Station Treasure Island ecological screening levels. Attachment to March 15, 2006 HERD memorandum to David Risk, DTSC Project Manager, OMF Berkeley Office.

[illegible]